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**Earthquakes
in the United States,
April-June 1977**



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By J. H. Minsch, C. W. Stover, and R. B. Simon

G E O L O G I C A L S U R V E Y C I R C U L A R 7 8 8 – B

United States Department of the Interior
CECIL D. ANDRUS, *Secretary*



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INTRODUCTION

The earthquake information in this publication supplements that published in the NEIS (National Earthquake Information Service) publications, PDE ("Preliminary Determination of Epicenters") and "Preliminary Determination of Epicenters, Monthly Listing," to the extent of providing detailed felt and intensity data, as well as isoseismal maps for U.S. earthquakes. The purpose is to provide a complete listing of macroseismic effects of earthquakes, which can be used in risk studies, nuclear power plant site evaluations, seismicity studies, and answering inquiries by the public.

This publication contains two major sections. The first (table 1) is a tabular listing of earthquakes in chronological order by State, consisting of the following basic information: date, origin time, hypocenter, magnitude, maximum intensity, and computational source of the hypocenter. The second section consists of one map and table 2, which lists detailed intensity information. The list of earthquakes in table 1 was compiled from those located in the United States or off the coasts that were published in the PDE; from hypocenters in California above magnitude 3.0, supplied by California Institute of Technology, Pasadena, the University of California, Berkeley, and other offices of the U.S. Geological Survey; from hypocenters in Hawaii supplied by the Hawaiian Volcano Observatory; and from any others that were felt or that caused damage, regardless of magnitude or availability of a hypocenter. Known or suspected explosions are also listed.

The intensities and macroseismic data were compiled from information obtained through questionnaires, from newspaper articles, and with the cooperation of other Government agencies, State institutions, local organizations, and individuals. (See "Acknowledgments" for a list of collaborators.) Figure 1 is the questionnaire in current use by the NEIS. Other versions of this questionnaire are used by State agencies, engineering firms, and other Government agencies to collect intensity data. Anyone wishing to submit felt or damage information on earthquakes

for inclusion in future reports should send it to the National Earthquake Information Service, Stop 967, Box 25046, Denver Federal Center, Denver, CO 80225. Copies of the current "Earthquake Report" questionnaire can be obtained at this address.

The primary method used by the NEIS to collect macroseismic information is a questionnaire canvass using the "Earthquake Report" forms, which are mailed to postmasters in the area affected by the earthquake. The postmasters complete the forms and return them to the NEIS, where they are evaluated and an intensity value is assigned. The intensity observations are mapped and contoured by isoseismals. Isoseismal contours present a generalization of intensity data and an extrapolation of these data to regions from which there are no observations; they do not necessarily account for every individual observation.

The data in table 2 will be included in the "Earthquake Description" section of "United States Earthquakes," an annual publication, to which later data from other sources may be added for the purpose of updating and completeness. "United States Earthquakes" is published jointly by the U.S. Geological Survey, Department of the Interior, and the Environmental Data Service, NOAA, Department of Commerce.

DISCUSSION OF TABLES

The parameters for the earthquakes in table 1 and table 2 include the date, origin time, hypocenter (epicenter and focal depth), magnitude, intensity, and hypocenter source. The origin time and date are listed in Universal Coordinated Time (UTC) and local standard time based on the time-zone maps in figures 2 and 3. The epicenters, which were taken from those published in the PDE, or from other sources as noted, are listed here to two decimals. The accuracy of the epicenters is that claimed by the institution supplying the hypocenter and is not necessarily the accuracy indicated by the number of decimals listed. The epicenters located by the NEIS have a varying degree of accuracy, usually two-tenths of

U.S. DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
EARTHQUAKE REPORT

Form Approved
OMB No. 42-R1700

Please answer this questionnaire carefully and return as soon as possible.

1. Was an earthquake felt by anyone in your town or zip code area recently?

☐ Not felt: Please refold and tape for return mail.

☐ Felt: Date _____ Time _____ ☐ AM ☐ Standard time
☐ PM ☐ Daylight time

Name of person filling out form _____

Address _____

City _____ County _____

State _____ Zip code _____

If you felt the earthquake, complete the following section. If others felt the earthquake but you did not, skip the personal report and complete the community report.

PERSONAL REPORT

2a. Did you personally feel the earthquake? 1 ☐ Yes ☐ No

b. Were you awakened by the earthquake? 2 ☐ Yes ☐ No

c. Were you frightened by the earthquake? 3 ☐ Yes ☐ No

d. Were you at 4 ☐ Home 5 ☐ Work 6 ☐ Other?

e. Town and zip code of your location at time of earthquake _____

f. Check your activity when the earthquake occurred:

7 ☐ Walking 8 ☐ Sleeping 9 ☐ Lying down 10 ☐ Standing
11 ☐ Driving (car in motion) 12 ☐ Sitting 13 ☐ Other

g. Were you 14 ☐ Inside or 15 ☐ Outside?

h. If inside, on what floor were you? 16 ☐

Continue on to next section which should include personal as well as reported observations.

COMMUNITY REPORT

Check one box for each question that is applicable.

3a. The earthquake was felt by ☐ No one 17 ☐ Few 18 ☐ Several 19 ☐ Many 20 ☐ All?

b. This earthquake awakened ☐ No one 21 ☐ Few 22 ☐ Several 23 ☐ Many 24 ☐ All?

c. This earthquake frightened ☐ No one 25 ☐ Few 26 ☐ Several 27 ☐ Many 28 ☐ All?

4. What outdoor physical effects were noted in your community?

Parapets or cornices fallen	29 <input type="checkbox"/> Yes <input type="checkbox"/> No		
Trees and bushes shaken	30 <input type="checkbox"/> Slightly 31 <input type="checkbox"/> Moderately 32 <input type="checkbox"/> Strongly		
Standing vehicles rocked	33 <input type="checkbox"/> Slightly 34 <input type="checkbox"/> Moderately 35 <input type="checkbox"/> Strongly		
Moving vehicles rocked	36 <input type="checkbox"/> Slightly 37 <input type="checkbox"/> Moderately 38 <input type="checkbox"/> Strongly		
Ground cracks	39 <input type="checkbox"/> Wet ground 40 <input type="checkbox"/> Steep slopes 41 <input type="checkbox"/> Dry and level ground		
Landslides	42 <input type="checkbox"/> Small 43 <input type="checkbox"/> Large		
Underground pipes	44 <input type="checkbox"/> Broken 45 <input type="checkbox"/> Out of service		
Water splashed onto sides of lakes, ponds, swimming pools	46 <input type="checkbox"/> Yes <input type="checkbox"/> No		
Elevated water tanks	47 <input type="checkbox"/> Cracked 48 <input type="checkbox"/> Twisted 49 <input type="checkbox"/> Fallen (thrown down) 50 <input type="checkbox"/> Displaced 51 <input type="checkbox"/> Rotated 52 <input type="checkbox"/> Fallen		
Air coolers	53 <input type="checkbox"/> Slightly 54 <input type="checkbox"/> Greatly 55 <input type="checkbox"/> Cracked 56 <input type="checkbox"/> Fallen 57 <input type="checkbox"/> Destroyed 58 <input type="checkbox"/> Displaced 59 <input type="checkbox"/> Cracked 60 <input type="checkbox"/> Rotated		
Railroad tracks bent	61 <input type="checkbox"/> Fallen 62 <input type="checkbox"/> Cracked 63 <input type="checkbox"/> Twisted 64 <input type="checkbox"/> Fallen		
Stone or brick fences	65 <input type="checkbox"/> Broken at roof line 66 <input type="checkbox"/> Bricks fallen		
Tombstones	67 <input type="checkbox"/> Cracked slightly 68 <input type="checkbox"/> Large cracks 69 <input type="checkbox"/> Displaced 70 <input type="checkbox"/> Cracked slightly 71 <input type="checkbox"/> Large cracks 72 <input type="checkbox"/> Displaced		
Chimneys			
Highways or streets			
Sidewalks			

Continued on the reverse side

FIGURE 1.--Example of the "Earthquake Report" form used for evaluating the intensities of earthquakes. A, front side.

5. What indoor physical effects were noted in your community?

Windows, doors, dishes rattled	73 <input type="checkbox"/> Yes	<input type="checkbox"/> No
Buildings creaked	74 <input type="checkbox"/> Yes	<input type="checkbox"/> No
Building trembled (shook)	75 <input type="checkbox"/> Yes	<input type="checkbox"/> No
Hanging pictures	76 <input type="checkbox"/> Swung	77 <input type="checkbox"/> Out of place
Water in small containers	79 <input type="checkbox"/> Spilled	80 <input type="checkbox"/> Slightly disturbed
Windows	81 <input type="checkbox"/> Few cracked	82 <input type="checkbox"/> Some broken
		83 <input type="checkbox"/> Many broken

6a. Did hanging objects, doors swing? ☐ No

84 <input type="checkbox"/> Slightly	85 <input type="checkbox"/> Moderately
86 <input type="checkbox"/> Violently	

b. Can you estimate direction? ☐ No

87 <input type="checkbox"/> North/South	88 <input type="checkbox"/> East/West
89 <input type="checkbox"/> Other	

7a. Were small objects (dishes, knick-knacks, pictures) ☐ Unmoved

91 <input type="checkbox"/> Overturned	92 <input type="checkbox"/> Fallen, not broken	93 <input type="checkbox"/> Broken?
--	--	-------------------------------------

b. Was light furniture ☐ Unmoved

95 <input type="checkbox"/> Overturned	94 <input type="checkbox"/> Shifted	96 <input type="checkbox"/> Fallen, not broken	97 <input type="checkbox"/> Broken?
--	-------------------------------------	--	-------------------------------------

c. Were heavy furniture or appliances ☐ Unmoved

99 <input type="checkbox"/> Shifted	98 <input type="checkbox"/> Overturned	100 <input type="checkbox"/> Broken?
-------------------------------------	--	--------------------------------------

8. Indicate effects of the following types to interior walls if any:

Plaster	101 <input type="checkbox"/> Cracked	102 <input type="checkbox"/> Fell
Dry wall	103 <input type="checkbox"/> Cracked	104 <input type="checkbox"/> Fell
Ceiling tiles	105 <input type="checkbox"/> Cracked	106 <input type="checkbox"/> Fell

9a. Check below any damage to buildings or structures.

Foundation	107 <input type="checkbox"/> Cracked	108 <input type="checkbox"/> Destroyed
Interior walls	109 <input type="checkbox"/> Split	110 <input type="checkbox"/> Fallen
Exterior walls	112 <input type="checkbox"/> Hairline cracks	113 <input type="checkbox"/> Large cracks
	115 <input type="checkbox"/> Partial collapse	116 <input type="checkbox"/> Total collapse
Building	117 <input type="checkbox"/> Moved on foundation	118 <input type="checkbox"/> Shifted off foundation

b. What type of construction was the building that showed this damage?

119 <input type="checkbox"/> Wood	120 <input type="checkbox"/> Stone	121 <input type="checkbox"/> Brick veneer	122 <input type="checkbox"/> Other
123 <input type="checkbox"/> Brick	124 <input type="checkbox"/> Cinderblock	125 <input type="checkbox"/> Reinforced concrete	

c. What was the type of ground under the building?

126 <input type="checkbox"/> Don't know	127 <input type="checkbox"/> Sandy soil	128 <input type="checkbox"/> Marshy	129 <input type="checkbox"/> Fill
130 <input type="checkbox"/> Hard rock	131 <input type="checkbox"/> Clay soil	132 <input type="checkbox"/> Sandstone, limestone, shale	

d. Was the ground: ☐ Level ☐ Sloping ☐ Steep?

e. Check the approximate age of the building:

136 <input type="checkbox"/> Built before 1935	137 <input type="checkbox"/> Built 1935-65	138 <input type="checkbox"/> Built after 1965
--	--	---

10a. What percentage of buildings were damaged?

Within 2 city blocks of your location	<input type="checkbox"/> None	139 <input type="checkbox"/> Few (about 5%)
	140 <input type="checkbox"/> Many (about 50%)	141 <input type="checkbox"/> Most (about 75%)

b. In area covered by your zip code

<input type="checkbox"/> None	142 <input type="checkbox"/> Few (about 5%)
143 <input type="checkbox"/> Many (about 50%)	144 <input type="checkbox"/> Most (about 75%)

11a. Were springs or well water disturbed? ☐ Level changed ☐ Flow disturbed

147 <input type="checkbox"/> Muddied	<input type="checkbox"/> Don't know
--------------------------------------	-------------------------------------

b. Were rivers or lakes changed? ☐ Yes ☐ No ☐ Don't know

12a. Was there earth noise? ☐ No ☐ Faint ☐ Moderate ☐ Loud

152 <input type="checkbox"/> North	153 <input type="checkbox"/> South	154 <input type="checkbox"/> East	155 <input type="checkbox"/> West
------------------------------------	------------------------------------	-----------------------------------	-----------------------------------

c. Estimated duration of shaking

156 <input type="checkbox"/> Sudden, sharp (less than 10 secs)	157 <input type="checkbox"/> Long (30-60 secs)
158 <input type="checkbox"/> Short (10-30 secs)	159 <input type="checkbox"/> Other

13. What is the approximate population of your city/town? Or are you in a

160 <input type="checkbox"/> Less than 1,000	161 <input type="checkbox"/> 10,000 to 100,000	164 <input type="checkbox"/> Rural area?
162 <input type="checkbox"/> 1,000 to 10,000	163 <input type="checkbox"/> Over 100,000	

This community report is associated with what town or zip code? _____

Thank you for your time and information. Refold this card and tape for return mail.

FIGURE 1.--Example of the "Earthquake Report" form used for evaluating the intensities of earthquakes. B, reverse side.



FIGURE 2.--Standard time zones of the conterminous United States. The number in each zone shows the number of hours to be subtracted from Universal Coordinated Time to convert to local standard time. (Subtract 1 hour less for local daylight-saving time.)

a degree or less, depending on their continental or oceanic location. The oceanic hypocenters are less accurate than those on the continent, even though both are listed to two decimals. Depths are listed to the nearest whole kilometer.

Figures 4-6 are maps summarizing the earthquake activity for the conterminous United States, Alaska, and Hawaii for the period April-June 1977. The magnitudes plotted in these figures are based on ML or mBLg; if neither was computed, then on MS; and finally on mb, when it was the only magnitude computed.

The magnitude values listed in tables 1 and 2 were furnished by cooperating institutions or determined by the NEIS. The computational sources are labeled according to the assigned letter codes shown in headnotes to tables 1 and 2; the letter follows the value listed under the column heading "Magnitude." In table 1 the absence of a letter code indicates that the NEIS is the source. In table 2 the magnitude source is the same as the location source unless indicated otherwise, by an alphabetic character to the right of the magnitude

value. The magnitude values calculated by the NEIS are based on the following formulas:

$$MS = \log(A/T) + 1.66 \log D + 3.3, \quad (1)$$

as adopted by the International Association of Seismology and Physics of the Earth's Interior (IASPEI; Bath, 1966, p. 153), where A is the maximum horizontal surface-wave ground amplitude, in micrometers; T is the period, in seconds, and $18 \leq T \leq 22$; and D is the distance, in geocentric degrees (station to epicenter), and $20^\circ \leq D \leq 160^\circ$. No depth correction is made for depths less than 50 km.

$$mb = \log(A/T) + Q(D, h), \quad (2)$$

as defined by Gutenberg and Richter (1956), except that T, the period in seconds, is restricted to $0.1 \leq T \leq 3.0$, and A, the ground amplitude in micrometers, is not necessarily the maximum of the P-wave group. Q is a function of distance D and depth h, where $D \geq 5^\circ$.

$$ML = \log A - \log A_0, \quad (3)$$

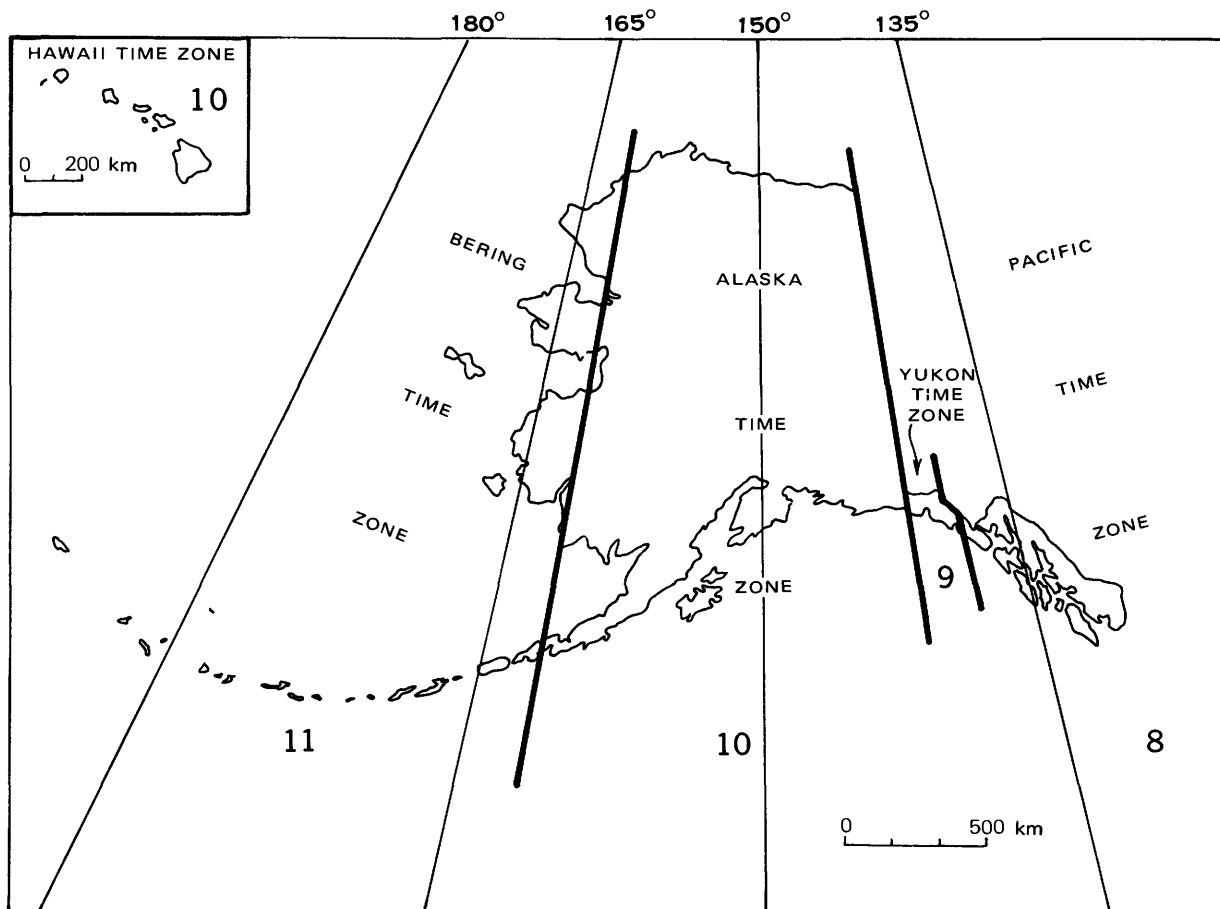


FIGURE 3.--Standard time zones of Alaska and Hawaii. The number in each zone shows the number of hours to be subtracted from Universal Coordinated Time to convert to local standard time. (Subtract 1 hour less for local daylight-saving time.)

as defined by Richter (1958, p. 340), where A is the maximum trace amplitude in millimeters, written by a Wood-Anderson torsion seismometer, and $\log A_0$ is a standard value as a function of distance, where the distance is ≤ 600 km. ML values are also calculated from other seismometers by conversion of recorded ground motion to the expected response of the torsion seismometer.

$$mbLg = 3.75 + 0.90(\log D) + \log(A/T) \quad (4)$$

$$0.5^\circ \leq D \leq 4^\circ,$$

$$mbLg = 3.30 + 1.66(\log D) + \log(A/T)$$

$$4^\circ \leq D \leq 30^\circ,$$

as proposed by Nuttli (1973), where A/T is expressed in micrometers per second, calculated from the vertical-component 1-second Lg waves, and D is the distance in geocentric degrees.

All of the intensity values (indicated by Roman numerals) listed in this summary were derived, using the Modified Mercalli Intensity Scale of 1931 (Wood and Neumann, 1931) shown

below, from the evaluation of "Earthquake Report" forms; from field reports by U.S. Geological Survey personnel, engineering firms, or universities; and from detailed macroseismic data communicated to the NEIS by people in the area affected by the earthquake. All earthquake reports received which contain minimal information are assigned an Intensity II. These reports are filed in the offices of the NEIS or in government archives and are available for detailed study.

MODIFIED MERCALLI INTENSITY SCALE OF 1931

Adapted from Sieberg's Mercalli-Cancani scale, modified and condensed.

- I. Not felt - or, except rarely under especially favorable circumstances. Under certain conditions, at and outside the boundary of the area in which a great shock is felt: sometimes birds, animals,

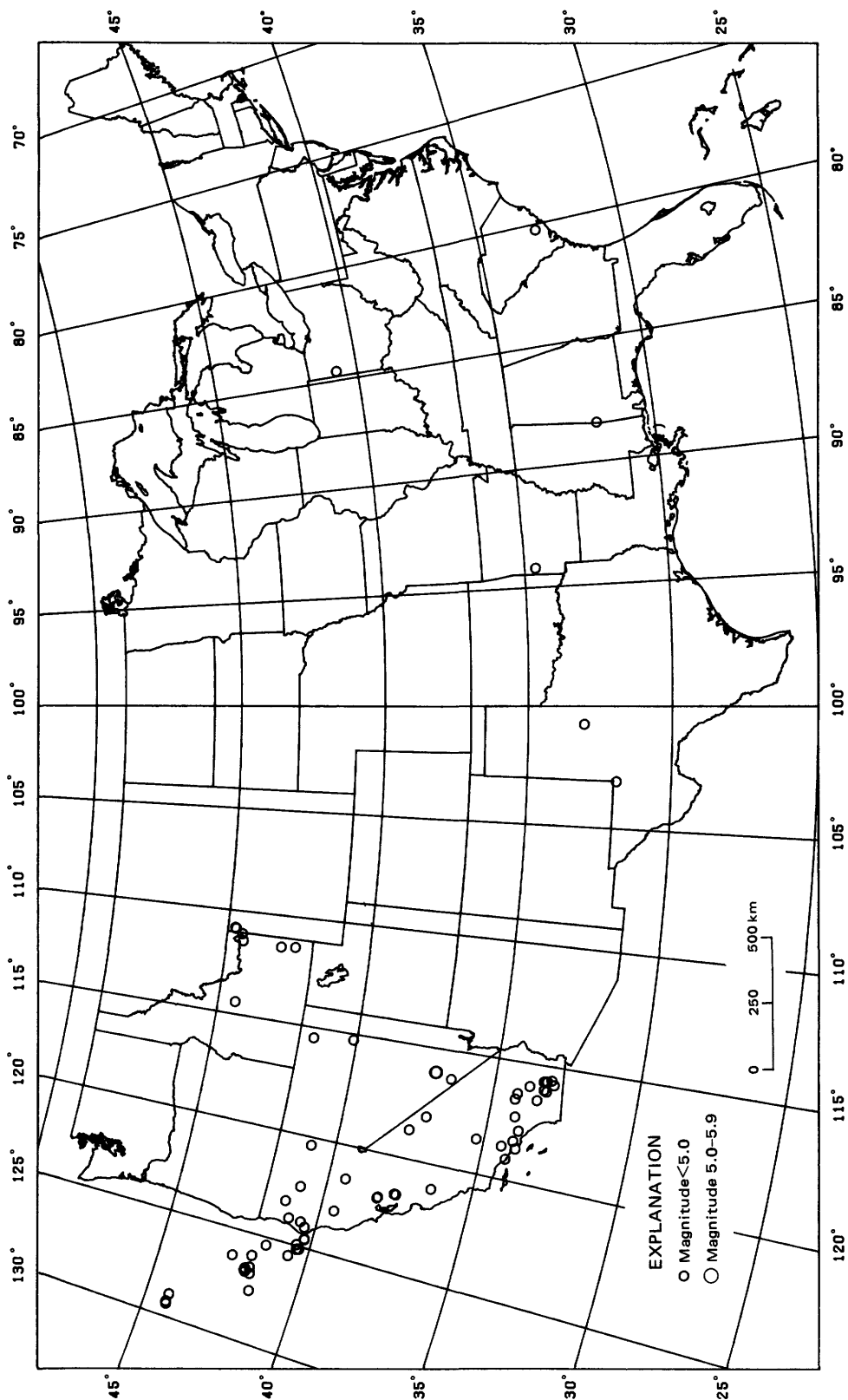


FIGURE 4.—Earthquake epicenters in the conterminous United States for April-June 1977, plotted from table 1.

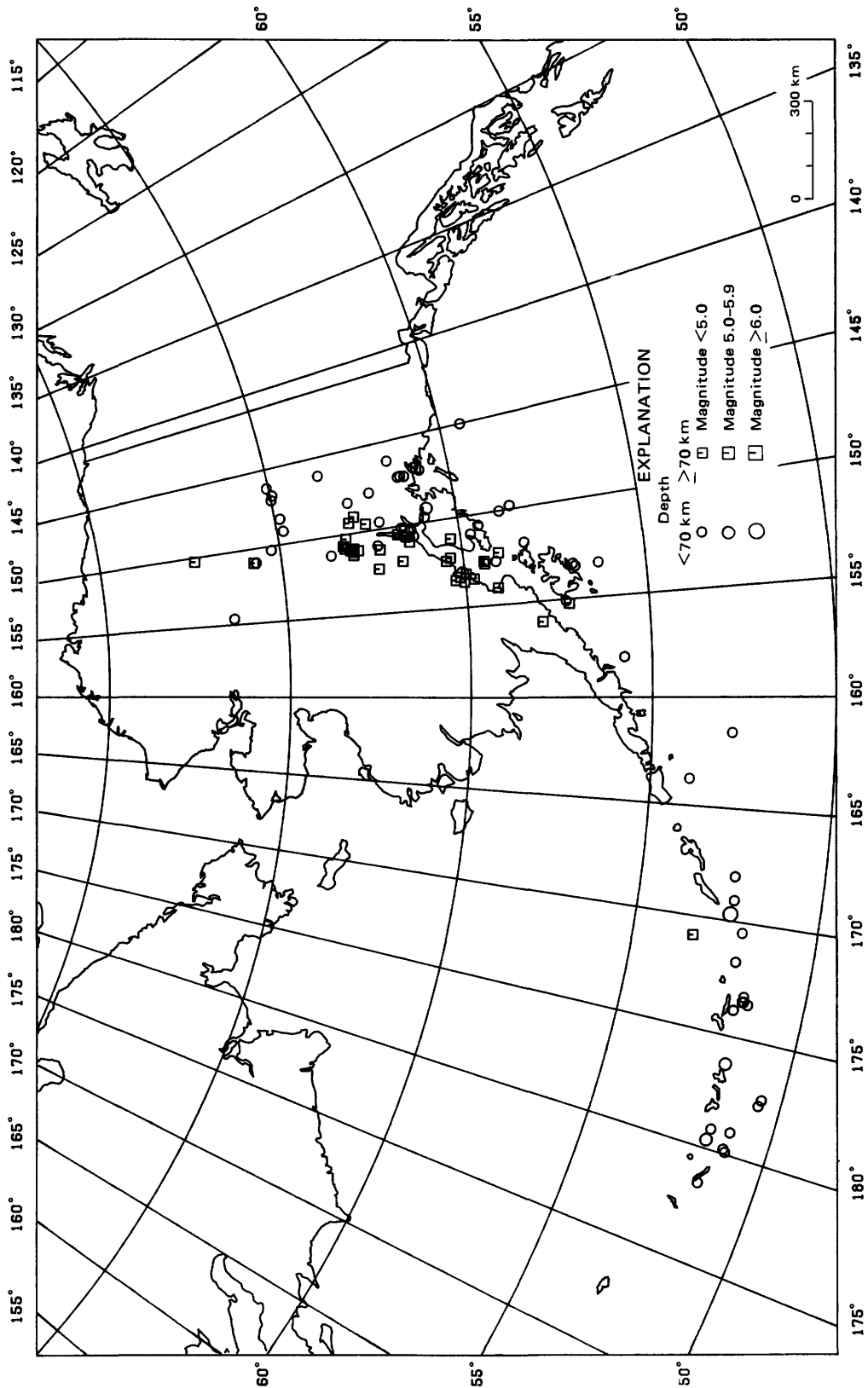


FIGURE 5.--Earthquake epicenters in Alaska for April-June 1977, plotted from table 1.

reported uneasy or disturbed; sometimes dizziness or nausea experienced; sometimes trees, structures, liquids, bodies of water, may sway--doors may swing, very slowly.

- II. Felt indoors by few, especially on upper floors, or by sensitive, or nervous persons. Also, as in grade I, but often more noticeably: sometimes hanging objects may swing, especially when delicately suspended; sometimes trees, structures, liquids, bodies of water, may sway, doors may swing, very slowly; sometimes birds, animals, reported uneasy or disturbed; sometimes dizziness or nausea experienced.
- III. Felt indoors by several, motion usually rapid vibration. Sometimes not recognized to be an earthquake at first. Duration estimated in some cases. Vibration like that due to passing of light, or lightly loaded trucks, or heavy trucks some distance away. Hanging objects may swing slightly. Movements may be appreciable on upper levels of tall structures. Rocked standing motor cars slightly.
- IV. Felt indoors by many, outdoors by few. Awakened few, especially light sleepers. Frightened no one, unless apprehensive from previous experience. Vibration like that due to passing of heavy or heavily loaded trucks. Sensation like heavy body striking building or falling of heavy objects inside. Rattling of dishes, windows, doors; glassware and crockery clink and clash. Creaking of walls, frame, especially in the upper range of this grade. Hanging objects swung, in numerous instances. Disturbed liquids in open vessels slightly. Rocked standing motor cars noticeably.
- V. Felt indoors by practically all, outdoors by many or most: outdoors direction estimated. Awakened many, or most. Frightened few--slight excitement, a few ran outdoors. Buildings trembled throughout. Broke dishes, glassware, to some extent. Cracked windows--in some cases, but not generally. Overturned vases, small or unstable objects, in many instances, with occasional fall. Hanging objects, doors, swing generally or considerably. Knocked pictures against walls, or swung them out of place. Opened, or closed, doors, shutters, abruptly. Pendulum clocks stopped, started or ran fast, or slow. Moved small objects, furnishings, the latter to slight extent. Spilled liquids in small amounts from well-filled open containers. Trees, bushes, shaken slightly.
- VI. Felt by all, indoors and outdoors. Frightened many, excitement general, some alarm, many ran outdoors. Awakened all. Persons made to move unsteadily. Trees, bushes, shaken slightly to moderately. Liquid set in strong motion. Small bells rang--church, chapel, school, etc. Damage slight in poorly built buildings. Fall of plaster in small amount. Cracked plaster somewhat, especially fine cracks chimneys in some instances. Broke dishes, glassware, in considerable quantity, also some windows. Fall of knick-knacks, books, pictures. Overturned furniture in many instances. Moved furnishings of moderately heavy kind.
- VII. Frightened all--general alarm, all ran outdoors. Some, or many, found it difficult to stand. Noticed by persons driving motor cars. Trees and bushes shaken moderately to strongly. Waves on ponds, lakes, and running water. Water turbid from mud stirred up. Incaving to some extent of sand or gravel stream banks. Rang large church bells, etc. Suspended objects made to quiver. Damage negligible in buildings of good design and construction, slight to moderate in well-built ordinary buildings, considerable in poorly built or badly designed buildings, adobe houses, old walls (especially where laid up without mortar), spires, etc. Cracked chimneys to considerable extent, walls to some extent. Fall of plaster in considerable to large amount, also some stucco. Broke numerous windows, furniture to some extent. Shook down loosened brickwork and tiles. Broke weak chimneys at the roof-line (sometimes damaging roofs). Fall of cornices from towers and high buildings. Dislodged bricks and stones. Overturned heavy furniture, with damage from breaking. Damage considerable to concrete irrigation ditches.
- VIII. Fright general--alarm approaches panic. Disturbed persons driving motor cars. Trees shaken strongly--branches, trunks, broken off, especially palm trees. Ejected sand and mud in small amounts. Changes: temporary, permanent; in flow of springs and wells; dry wells renewed flow; in temperature of spring and well waters. Damage slight in structures (brick) built especially to withstand earthquakes. Considerable in ordinary substantial buildings, partial collapse: racked, tumbled down, wooden houses in some cases; threw out panel walls in frame structures, broke off decayed piling. Fall of walls. Cracked, broke, solid stone walls seriously. Wet ground to some extent, also ground on steep slopes. Twisting, fall, of chimneys, columns, monuments, also factory stacks, towers. Moved conspicuously, overturned, very heavy furniture.

IX. Panic general. Cracked ground conspicuously. Damage considerable in (masonry) structures built especially to withstand earthquakes: Threw out of plumb some wood-frame houses built especially to withstand earthquakes; great in substantial (masonry) buildings, some collapse in large part; or wholly shifted frame buildings off foundations, racked frames; serious to reservoirs; underground pipes sometimes broken.

X. Cracked ground, especially when loose and wet, up to widths of several inches; fissures up to a yard in width ran parallel to canal and stream banks. Landslides considerable from river banks and steep coasts. Shifted sand and mud horizontally on beaches and flat land. Changed level of water in wells. Threw water on banks of canals, lakes, rivers, etc. Damage serious to dams, dikes, embankments. Severe to well-built wooden structures and bridges, some destroyed. Developed dangerous cracks in excellent brick walls. Destroyed most masonry and frame structures, also their foundations. Bent railroad rails slightly. Tore apart, or crushed endwise, pipe lines buried in earth. Open cracks and broad wavy folds in cement pavements and asphalt road surfaces.

XI. Disturbances in ground many and widespread, varying with ground material. Broad fissures, earth slumps, and land slips in soft, wet ground. Ejected water in large amounts charged with sand and mud. Caused sea-waves ("tidal" waves) of significant magnitude. Damage severe to wood-frame structures, especially near shock centers. Great to dams, dikes, embankments often for long distances. Few, if any (masonry) structures remained standing. Destroyed large well-built bridges by the wrecking of supporting piers, or pillars. Affected yielding wooden bridges less. Bent

railroad rails greatly, and thrust them endwise. Put pipe lines buried in earth completely out of service.

XII. Damage total--practically all works of construction damaged greatly or destroyed. Disturbances in ground great and varied, numerous shearing cracks. Landslides, falls of rock of significant character, slumping of river banks, etc., numerous and extensive. Wrenched loose, tore off, large rock masses. Fault slips in firm rock, with notable horizontal and vertical offset displacements. Water channels, surface and underground, disturbed and modified greatly. Dammed lakes, produced waterfalls, deflected rivers, etc. Waves seen on ground surfaces (actually seen, probably, in some cases). Distorted lines of sight and level. Threw objects upward into the air.

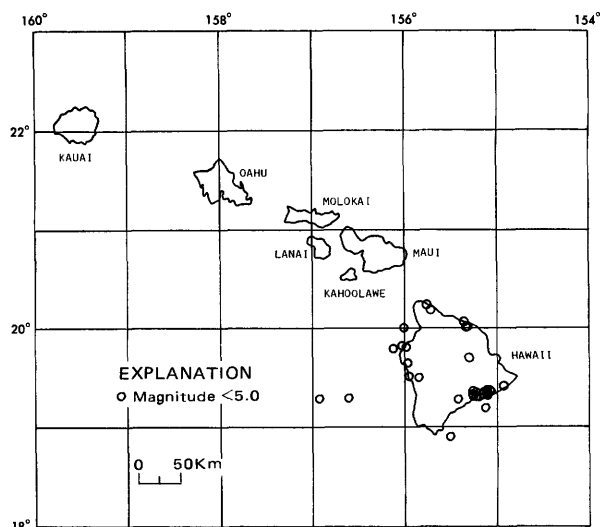


FIGURE 6.--Earthquake epicenters in Hawaii for April-June 1977, plotted from table 1.

Table 1.—Summary of U.S. earthquakes for April-June 1977

[Sources of the hypocenter and magnitudes: (A) U.S. Energy Research and Development Administration; (B) University of California, Berkeley; (F) USGS Open-File Report 78-672 (Fuis and others, 1978). (G) U.S. Geological Survey, National Earthquake Information Service; (H) U.S. Geological Survey, Hawaiian Volcano Observatory; (K) University of Michigan, Ann Arbor; (M) NOAA, Alaska Tsunami Warning Center, Palmer; (P) California Institute of Technology, Pasadena; (S) St. Louis University, St. Louis, Missouri; (W) University of Washington, Seattle. N, Normal depth; UTC, Universal Coordinated Time. For names of local time zones, see figures 2 and 3. Leaders (...) indicate no information available]

Date (1977)		Origin time			Lat	Long	Depth (km)	Magnitude			Maximum intensity	Hypocenter source	Local time				
		(UTC)						mb	MS	ML or mbLg			Date	Hour			
		hr	min	s													
ALABAMA																	
MAY	4	02	00	22.9	31.98 N.	88.42 W.	5	...	...	3.6S	V	G	MAY	3	08	P.M.	CST
ALASKA																	
APR.	1	17	57	34.9	62.33 N.	152.34 W.	78	...	...	...	...	G	APR.	1	07	A.M.	AST
APR.	2	01	36	41.2	52.82 N.	161.60 W.	33N	4.6	...	...	...	G	APR.	1	02	P.M.	BST
APR.	11	19	23	10.8	51.11 N.	179.92 W.	59	4.6	...	...	...	G	APR.	11	08	A.M.	BST
APR.	12	13	06	00.3	60.80 N.	149.22 W.	39	4.4	...	5.1M	III	G	APR.	13	03	A.M.	AST
APR.	13	18	20	43.3	51.70 N.	179.61 W.	46	5.1	...	...	...	G	APR.	13	07	A.M.	BST
APR.	14	09	32	05.2	51.19 N.	179.80 W.	64	4.4	...	...	...	G	APR.	13	10	P.M.	BST
APR.	16	04	02	17.1	52.02 N.	170.47 W.	15	4.9	...	...	...	G	APR.	15	05	P.M.	BST
APR.	17	07	15	41.9	62.53 N.	149.58 W.	77	...	...	...	...	G	APR.	16	09	P.M.	AST
APR.	17	09	25	08.0	59.02 N.	152.21 W.	118	...	...	...	...	G	APR.	16	11	P.M.	AST
APR.	18	23	44		NEAR MCGRATH		.	...	...	4.1M	III	.	APR.	18	01	P.M.	AST
APR.	19	14	39	08.7	57.20 N.	155.22 W.	74	4.3	...	...	...	G	APR.	19	04	A.M.	AST
APR.	19	15	53	19.7	60.97 N.	146.83 W.	21	3.9	...	3.5M	...	G	APR.	19	05	A.M.	AST
APR.	20	00	19	13.5	51.12 N.	179.03 W.	33N	4.7	...	...	...	G	APR.	19	01	P.M.	BST
APR.	20	12	11	49.1	59.45 N.	150.61 W.	33N	4.8	...	4.1M	IV	G	APR.	20	02	A.M.	AST
APR.	20	15	02	51.6	62.85 N.	151.05 W.	114	4.5	...	...	...	G	APR.	20	05	A.M.	AST
APR.	20	23	36	51.7	63.60 N.	151.17 W.	3	...	...	3.4M	...	G	APR.	20	01	P.M.	AST
APR.	23	17	59		NEAR FAIRBANKS		.	...	...	...	II	.	APR.	23	07	A.M.	AST
APR.	23	21	57	20.6	60.27 N.	151.14 W.	80	...	...	...	II	G	APR.	23	11	A.M.	AST
APR.	24	03	29	13.7	52.38 N.	169.07 W.	59	4.5	...	...	...	G	APR.	23	04	P.M.	BST
APR.	24	03	33	27.4	64.82 N.	149.17 W.	27	...	...	3.2M	...	G	APR.	23	05	P.M.	AST
APR.	24	07	01	55.2	65.04 N.	146.22 W.	36	4.0	...	3.9M	...	G	APR.	23	09	P.M.	AST
APR.	25	01	19	06.3	65.77 N.	150.94 W.	75	...	...	...	...	G	APR.	24	03	P.M.	AST
APR.	25	02	28	54.4	61.42 N.	147.20 W.	36	...	...	4.2M	...	G	APR.	24	04	P.M.	AST
APR.	25	03	18	25.0	65.71 N.	150.95 W.	33N	...	...	4.0M	...	G	APR.	24	05	P.M.	AST
APR.	26	00	48	12.1	59.41 N.	152.70 W.	79	...	...	...	...	G	APR.	25	02	P.M.	AST
APR.	27	13	29	08.4	62.29 N.	150.97 W.	38	...	...	3.1M	II	G	APR.	27	03	A.M.	AST
APR.	27	13	37	44.2	62.99 N.	151.07 W.	157	...	...	...	...	G	APR.	27	03	A.M.	AST
APR.	28	00	45	34.9	53.37 N.	170.88 W.	207	4.2	...	...	...	G	APR.	27	01	P.M.	BST
APR.	28	13	37	37.7	50.60 N.	177.63 W.	21	4.4	...	...	...	G	APR.	28	02	A.M.	BST
APR.	28	18	58	52.7	61.41 N.	150.96 W.	73	3.5	...	...	...	G	APR.	28	08	A.M.	AST
APR.	29	01	27	34.3	59.71 N.	151.02 W.	52	...	...	...	...	G	APR.	28	03	P.M.	AST
APR.	29	08	15	11.8	59.42 N.	145.00 W.	8	4.7	4.1	4.5M	...	G	APR.	28	10	P.M.	AST
APR.	29	13	41	45.6	62.99 N.	151.33 W.	136	...	...	...	...	G	APR.	29	03	A.M.	AST
APR.	30	16	43	55.3	51.70 N.	173.42 W.	38	4.6	...	...	...	G	APR.	30	05	A.M.	BST
APR.	30	21	14	44.5	51.54 N.	173.53 W.	33N	3.9	...	...	...	G	APR.	30	10	A.M.	BST
APR.	30	21	49	40.7	51.65 N.	173.43 W.	42	4.8	4.8	...	...	G	APR.	30	10	A.M.	BST
MAY	1	01	27	42.3	64.94 N.	146.79 W.	38	...	...	3.2M	...	G	APR.	30	03	P.M.	AST
MAY	1	01	56	30.7	63.20 N.	150.87 W.	134	4.0	...	...	...	G	APR.	30	03	P.M.	AST
MAY	2	14	52	20.7	60.26 N.	153.47 W.	182	...	...	...	...	G	MAY	2	04	A.M.	AST
MAY	5	00	22	38.3	64.84 N.	148.36 W.	9	...	...	3.7M	III	G	MAY	4	02	P.M.	AST
MAY	6	16	48	23.8	59.43 N.	152.57 W.	87	...	...	...	...	G	MAY	6	06	A.M.	AST
MAY	7	04	09	32.1	61.65 N.	152.04 W.	130	4.5	...	...	...	G	MAY	6	06	P.M.	AST
MAY	7	09	17	23.1	59.10 N.	152.67 W.	67	...	...	...	...	G	MAY	6	11	P.M.	AST
MAY	7	22	18	42.4	51.68 N.	173.23 W.	33	4.8	...	...	...	G	MAY	7	11	A.M.	BST
MAY	8	13	37	56.1	63.16 N.	150.28 W.	124	...	...	...	...	G	MAY	8	03	A.M.	AST
MAY	9	14	38	26.6	52.09 N.	171.76 W.	36	3.8	...	...	...	G	MAY	9	03	A.M.	BST

Table 1.—Summary of U.S. earthquakes for April-June 1977—Continued

Date (1977)	Origin time (UTC)			Lat	Long	Depth (km)	Magnitude			Maximum intensity	Hypocenter source 1	Local time					
	hr	min	s				mb	MS	ML or mbLg			Date	Hour				
ALASKA--Cont inued																	
MAY	11	17	33	30.7	61.70 N.	150.47 W.	76	3.9	...	...	IV	G	MAY	11	07	A.M.	AST
MAY	12	15	08		NEAR WISEMAN		.	...	...	...	III	.	MAY	12	05	A.M.	AST
MAY	13	17	28	48.2	62.30 N.	147.78 W.	64	...	...	...	...	G	MAY	13	07	A.M.	AST
MAY	15	13	15	03.7	62.99 N.	149.36 W.	89	3.9	...	...	...	G	MAY	15	03	A.M.	AST
MAY	15	15	50	47.1	52.45 N.	168.02 W.	33N	5.3	4.7	...	...	G	MAY	15	04	A.M.	BST
MAY	17	15	51	26.5	63.24 N.	150.70 W.	135	...	...	...	...	G	MAY	17	05	A.M.	AST
MAY	18	01	43	10.7	59.11 N.	154.09 W.	131	...	...	...	...	G	MAY	17	03	P.M.	AST
MAY	18	21	34	48.0	60.81 N.	147.02 W.	52	...	...	3.7M	...	G	MAY	18	11	A.M.	AST
MAY	20	03	15	40.9	58.53 N.	149.80 W.	33N	4.2	...	3.8M	...	G	MAY	19	05	P.M.	AST
MAY	20	03	27	09.1	58.84 N.	150.03 W.	52	4.2	...	4.0M	...	G	MAY	19	05	P.M.	AST
MAY	23	13	59	47.0	57.02 N.	153.23 W.	33	4.6	...	...	...	G	MAY	23	03	A.M.	AST
MAY	24	00	53	43.2	65.22 N.	150.26 W.	52	...	...	3.5M	...	G	MAY	23	02	P.M.	AST
MAY	25	18	06	34.1	67.38 N.	150.30 W.	126	...	...	...	III	G	MAY	25	08	A.M.	AST
MAY	26	04	18	16.1	61.25 N.	147.22 W.	45	3.9	...	3.2M	...	G	MAY	25	06	P.M.	AST
MAY	26	21	16	47.6	61.27 N.	150.72 W.	59	...	...	...	...	G	MAY	26	11	A.M.	AST
MAY	27	18	08	07.8	62.94 N.	148.13 W.	58	...	...	...	...	G	MAY	27	08	A.M.	AST
MAY	27	23	35	04.2	66.47 N.	154.60 W.	33N	...	...	3.6M	...	G	MAY	27	01	P.M.	AST
MAY	28	13	38	11.8	62.26 N.	151.22 W.	98	...	...	...	...	G	MAY	28	03	A.M.	AST
MAY	30	15	16	01.6	52.43 N.	169.71 W.	33N	5.6	6.0	...	IV	G	MAY	30	04	A.M.	BST
MAY	30	18	40	26.6	60.89 N.	149.69 W.	42	...	...	...	II	G	MAY	30	08	A.M.	AST
MAY	31	00	44	23.2	64.98 N.	147.08 W.	26	...	...	3.3M	...	G	MAY	30	02	P.M.	AST
MAY	31	18	55	51.1	55.75 N.	158.03 W.	58	4.4	...	...	...	G	MAY	31	08	A.M.	AST
MAY	31	22	54	50.9	62.99 N.	151.12 W.	132	...	...	...	...	G	MAY	31	12	P.M.	AST
JUNE	1	07	13	07.3	60.13 N.	153.30 W.	152	4.0	...	...	...	G	MAY	31	09	P.M.	AST
JUNE	2	08	25	24.6	63.24 N.	150.69 W.	136	...	...	...	...	G	JUNE	1	10	P.M.	AST
JUNE	2	11	55	56.6	61.56 N.	150.13 W.	40	...	...	...	...	G	JUNE	2	01	A.M.	AST
JUNE	2	16	29	46.3	61.31 N.	150.33 W.	67	3.6	...	...	V	G	JUNE	2	06	A.M.	AST
JUNE	6	10	08	11.5	62.16 N.	149.55 W.	60	4.1	...	...	III	G	JUNE	6	00	A.M.	AST
JUNE	6	15	03	06.3	50.55 N.	177.37 W.	33N	4.0	...	...	...	G	JUNE	6	04	A.M.	BST
JUNE	6	22	41	15.9	51.56 N.	178.46 E.	67	4.7	...	...	...	G	JUNE	6	11	A.M.	BST
JUNE	7	03	51	46.7	51.66 N.	179.13 W.	56	4.5	...	...	...	G	JUNE	6	04	P.M.	BST
JUNE	10	04	45	08.8	59.75 N.	153.46 W.	131	4.5	...	...	...	G	JUNE	9	06	P.M.	AST
JUNE	10	12	14	29.3	61.36 N.	147.14 W.	58	...	...	...	...	G	JUNE	10	02	A.M.	AST
JUNE	12	21	09	14.4	61.63 N.	146.15 W.	35	4.2	...	4.2M	III	G	JUNE	12	11	A.M.	AST
JUNE	13	15	12	50.0	57.29 N.	155.07 W.	53	4.6	...	...	...	G	JUNE	13	05	A.M.	AST
JUNE	13	20	55	07.8	57.96 N.	156.08 W.	142	...	...	...	...	G	JUNE	13	10	A.M.	AST
JUNE	14	01	51	15.7	62.98 N.	150.95 W.	142	...	...	...	...	G	JUNE	13	03	P.M.	AST
JUNE	15	09	18	25.4	56.30 N.	153.28 W.	33N	4.6	4.2	...	...	G	JUNE	14	11	P.M.	AST
JUNE	15	23	15	40.7	51.89 N.	173.85 W.	49	4.4	...	...	...	G	JUNE	15	12	P.M.	BST
JUNE	16	01	24	54.3	60.02 N.	153.59 W.	176	4.7	...	...	...	G	JUNE	15	03	P.M.	AST
JUNE	16	04	45	23.2	63.07 N.	150.98 W.	140	...	...	...	...	G	JUNE	15	06	P.M.	AST
JUNE	17	05	32	12.0	58.27 N.	151.82 W.	36	...	...	4.0M	III	G	JUNE	16	07	P.M.	AST
JUNE	17	08	26	28.9	61.49 N.	150.32 W.	74	4.3	...	...	V	G	JUNE	16	10	P.M.	AST
JUNE	18	05	59	53.7	61.55 N.	150.67 W.	52	...	...	3.1M	...	G	JUNE	17	07	P.M.	AST
JUNE	18	11	29	49.2	60.88 N.	146.83 W.	76	...	...	...	...	G	JUNE	18	01	A.M.	AST
JUNE	18	16	59	05.6	60.34 N.	152.18 W.	117	...	...	...	...	G	JUNE	18	06	A.M.	AST
JUNE	18	23	51	42.4	63.60 N.	146.14 W.	33N	...	...	3.2M	...	G	JUNE	18	01	P.M.	AST
JUNE	20	00	41	17.7	53.93 N.	163.77 W.	33N	4.4	...	...	...	G	JUNE	19	01	P.M.	BST
JUNE	21	05	32	45.8	56.96 N.	153.35 W.	33N	4.0	...	3.7M	...	G	JUNE	20	07	P.M.	AST
JUNE	23	06	53	09.0	63.00 N.	151.00 W.	129	...	...	...	...	G	JUNE	22	08	P.M.	AST
JUNE	24	12	47	12.7	62.83 N.	149.02 W.	98	...	...	...	...	G	JUNE	24	02	A.M.	AST
JUNE	25	20	36	20.8	59.96 N.	153.18 W.	132	4.4	...	...	...	G	JUNE	25	10	A.M.	AST
JUNE	25	22	24	10.8	60.46 N.	152.35 W.	101	...	...	...	...	G	JUNE	25	12	P.M.	AST
JUNE	29	08	47	15.6	51.77 N.	176.22 W.	60	5.0	...	...	IV	G	JUNE	28	09	P.M.	BST
ARKANSAS																	
JUNE	2	23	29	10.4	34.61 N.	94.19 W.	10	4.3	...	4.0S	VI	S	JUNE	2	05	P.M.	CST
CALIFORNIA																	
APR.	2	06	09	11.9	40.57 N.	123.90 W.	14	4.4	...	3.6B	IV	B	APR.	1	10	P.M.	PST
APR.	3	10	20	44.9	39.54 N.	123.04 W.	22	...	...	3.1B	...	B	APR.	3	02	A.M.	PST
APR.	6	03	01	29.0	35.27 N.	118.55 W.	6	...	...	3.7F	...	F	APR.	5	07	P.M.	PST

Table 1.—Summary of U.S. earthquakes for April–June 1977—Continued

Date (1977)	Origin time (UTC)			Lat	Long	Depth (km)	Magnitude			Maximum intensity	Hypocenter source	Local time							
	hr	min	s				mb	MS	ML or mbLg			Date	Hour						
CALIFORNIA--Continued																			
APR. APR.	6 9	06 19	01 16	02.2 27.6	33.47 33.07	N. N.	116.47 115.57	W. W.	16 11	... ...	... ...	3.5P 3.2P	III ...	P P	APR. APR.	5 9	10 11	P.M. A.M.	PST PST
APR. APR. APR. APR. MAY	18 25 26 28 4	05 10 09 15 06	32 45 54 35 59	00.1 49.9 02.7 33.4 10.5	32.97 33.20 34.22 33.33 39.41	N. N. N. N. N.	115.75 116.05 116.58 115.68 121.49	W. W. W. W. W.	8 17 6 4 7	... ... ... ... ...	... ... ... ... ...	3.2P 3.2P 3.1P 3.3P 3.5B	... ... ... ... V	P P P P B	APR. APR. APR. APR. MAY	17 25 26 28 3	09 02 01 07 10	P.M. A.M. A.M. A.M. P.M.	PST PST PST PST PST
MAY MAY MAY MAY MAY	4 5 12 12 16	19 22 23 23 04	43 40 44 46 03	33.8 31.7 59.1 05.5 25.8	38.17 38.17 33.78 33.78 33.23	N. N. N. N. N.	121.94 121.94 115.95 115.95 115.66	W. W. W. W. W.	26 26 3 8 12	... ... ... ... ...	... ... ... ... ...	3.2B 3.3B 3.1P 3.5P 3.2F	III III	B B P P F	MAY MAY MAY MAY MAY	4 5 12 12 15	11 02 03 03 08	A.M. P.M. P.M. P.M. P.M.	PST PST PST PST PST
MAY MAY MAY MAY MAY	16 21 21 25 30	08 00 23 08 16	05 28 17 22 16	54.9 19.7 55.0 00.9 37.9	33.27 37.65 34.10 34.15 33.90	N. N. N. N. N.	115.70 118.75 117.32 119.15 117.88	W. W. W. W. W.	4 12 16 4 5	... ... ... ... ...	... ... ... ... ...	3.0P 3.4B 3.1P 2.5P 2.6P	... IV ... II I	P B P P P	MAY MAY MAY MAY MAY	16 20 21 25 30	00 04 03 00 08	A.M. P.M. P.M. A.M. A.M.	PST PST PST PST PST
MAY MAY JUNE JUNE JUNE	30 31 3 4 7	21 16 01 20 01	17 40 40 57 14	02.9 24.2 34.4 07.5 22.0	33.90 40.88 41.26 38.20 41.00	N. N. N. N. N.	117.88 122.33 123.12 121.97 123.87	W. W. W. W. W.	5 15 5 26 28	... ... ... ... 4.6	... ... ... ... ...	2.4P 3.7B 3.6B 3.8B 3.9B	II IV ... V V	P B G B B	MAY MAY JUNE JUNE JUNE	30 31 2 4 6	01 08 05 12 05	P.M. A.M. P.M. P.M. P.M.	PST PST PST PST PST
JUNE JUNE JUNE JUNE JUNE	11 13 13 14 14	14 03 03 01 04	18 17 19 56 37	20.5 44.9 36.9 33.6 03.1	34.38 34.18 33.87 34.02 37.15	N. N. N. N. N.	118.62 116.33 118.63 118.32 118.04	W. W. W. W. W.	5 1 5 5 5	... ... ... ... ...	... ... ... ... ...	3.1P 3.0P 2.8P 2.7P 3.1B	III ... II II ...	P P P P B	JUNE JUNE JUNE JUNE JUNE	11 12 12 13 13	06 07 07 05 08	A.M. P.M. P.M. P.M. P.M.	PST PST PST PST PST
JUNE JUNE JUNE JUNE JUNE	17 17 20 21 21	19 23 18 02 15	38 31 33 43 29	48.4 58.2 00.1 06.9 15.0	38.18 40.84 34.02 37.65 36.44	N. N. N. N. N.	121.93 120.38 118.32 121.64 121.05	W. W. W. W. W.	22 4 10 10 10	... ... ... 4.7 ...	... ... ... 3.5 ...	3.5B 3.1B 2.5P 4.6B 3.0B	IV ... II VI ...	B B P B B	JUNE JUNE JUNE JUNE JUNE	17 17 20 20 21	11 03 10 06 07	A.M. P.M. A.M. P.M. A.M.	PST PST PST PST PST
JUNE JUNE JUNE	23 23 28	04 07 12	03 12 46	58.5 51.5 40.7	40.40 33.27 37.59	N. N. N.	124.10 116.00 121.66	W. W. W.	2 5 8	... ... ...	... ... ...	3.1B 3.2P 3.1B	... ... ...	B P B	JUNE JUNE JUNE	22 22 28	08 11 04	P.M. P.M. A.M.	PST PST PST
CALIFORNIA--OFF THE COAST																			
APR. APR. APR. MAY MAY	8 11 11 2 10	08 23 23 05 00	59 48 53 57 9	59.0 19.8 39.0 00.2 25.4	41.76 40.45 40.38 40.68 41.88	N. N. N. N. N.	126.83 125.15 125.12 125.55 126.01	W. W. W. W. W.	15 25 23 15 15	4.6 4.7	... ... ... ... ...	... 4.1B 3.4B 3.4B 4.0B	... ... ... ... ...	G B B G G	APR. APR. APR. MAY MAY	8 11 11 1 9	00 03 03 09 04	A.M. P.M. P.M. P.M. P.M.	PST PST PST PST PST
JUNE JUNE JUNE JUNE JUNE	9 9 11 22 25	19 19 04 09 18	05 13 13 44 15	41.2 57.8 50.8 42.3 50.0	40.27 40.28 41.49 40.49 41.94	N. N. N. N. N.	124.63 124.62 125.37 124.94 126.80	W. W. W. W. W.	29 33 15 23 15	... ... ... 4.8 4.5	... ... ... ... 3.6	3.7B 3.5B 3.1B 3.9B ...	... ... ... ... ...	B B G B G	JUNE JUNE JUNE JUNE JUNE	9 9 10 22 25	11 11 08 01 10	A.M. A.M. P.M. A.M. A.M.	PST PST PST PST PST
JUNE JUNE	25 25	18 18	32 48	27.5 13.0	41.61 41.83	N. N.	127.62 126.57	W. W.	15 15	4.5 4.4	... ...	... ...	... ...	G G	JUNE JUNE	25 25	10 10	A.M. A.M.	PST PST
HAWAII																			
APR. APR. APR. APR. APR.	3 6 6 6 7	06 15 21 21 03	58 22 00 01 31	50.9 56.1 25.2 52.3 41.4	19.34 19.37 19.36 19.38 19.20	N. N. N. N. N.	155.14 155.10 155.09 155.08 155.12	W. W. W. W. W.	8 7 9 6 9	... ... ... ... ...	... ... ... ... ...	3.1H 3.0H 3.6H 3.0H 3.2H	... ... IV	H H H H H	APR. APR. APR. APR. APR.	2 6 6 6 6	08 05 11 11 05	P.M. A.M. A.M. A.M. P.M.	HST HST HST HST HST
APR. APR. MAY APR.	11 13 18 21 21	06 22 20 04 11	31 06 14 49 51	16.2 17.2 32.5 21.9 31.9	19.32 20.19 19.32 20.02 19.32	N. N. N. N. N.	155.27 155.71 155.27 155.31 155.27	W. W. W. W. W.	9 31 9 10 9	... ... ... ... ...	... ... ... ... ...	3.0H 3.3H 3.0H 5.1H 3.6H	III V III	H H H H H	APR. APR. MAY APR. APR.	10 13 18 20 21	08 12 10 06 01	P.M. P.M. A.M. P.M. A.M.	HST HST HST HST HST

Table 1.—Summary of U.S. earthquakes for April–June 1977—Continued

Date (1977)	Origin time (UTC)			Lat	Long	Depth (km)	Magnitude			Maximum intensity	Hypocenter source	Local time							
	hr	min	s				mb	MS	ML or mbLg			Date	Hour						
HAWAII--Continued																			
APR.	22	19	44	00.0	19.32 N.	155.26 W.	9	...	...	4.0H	IV	H	APR.	22	09	A.M.	HST
APR.	22	20	59	18.4	19.37 N.	155.08 W.	10	...	...	3.6H	...	H	APR.	22	10	A.M.	HST
APR.	23	07	45	23.2	19.35 N.	155.22 W.	9	...	...	3.2H	...	H	APR.	22	09	P.M.	HST
APR.	24	14	55	41.9	19.81 N.	155.97 W.	9	...	...	3.0H	...	H	APR.	24	04	A.M.	HST
APR.	25	17	41	12.7	19.70 N.	155.30 W.	23	...	...	3.2H	...	H	APR.	25	07	A.M.	HST
APR.	25	20	27	03.8	19.34 N.	155.19 W.	9	...	...	3.2H	...	H	APR.	25	10	A.M.	HST
APR.	26	04	20	53.0	19.34 N.	155.23 W.	9	...	...	3.5H	III	H	APR.	25	06	P.M.	HST
APR.	27	22	24	32.3	20.02 N.	155.32 W.	18	...	...	3.0H	...	H	APR.	27	12	P.M.	HST
MAY	1	06	56	59.8	19.31 N.	155.25 W.	10	...	...	3.1H	...	H	APR.	30	08	P.M.	HST
MAY	2	18	54	05.4	20.08 N.	155.36 W.	8	...	...	3.7H	IV	H	MAY	2	08	A.M.	HST
MAY	3	02	06	47.0	19.34 N.	155.19 W.	10	...	...	3.1H	...	H	MAY	2	04	P.M.	HST
MAY	4	14	22	58.1	20.24 N.	155.76 W.	34	...	...	3.1H	III	H	MAY	4	04	A.M.	HST
MAY	5	15	12	19.4	19.33 N.	155.15 W.	8	...	...	3.2H	...	H	MAY	5	05	A.M.	HST
MAY	8	04	40	47.7	19.30 N.	156.90 W.	47	...	...	3.2H	...	H	MAY	7	06	P.M.	HST
MAY	12	09	11	06.3	19.31 N.	155.22 W.	10	...	...	3.1H	III	H	MAY	11	11	P.M.	HST
MAY	14	15	35	10.8	19.34 N.	155.23 W.	9	...	...	3.0H	II	H	MAY	14	05	A.M.	HST
MAY	15	07	27	13.1	19.37 N.	155.10 W.	8	...	...	3.6H	III	H	MAY	14	09	P.M.	HST
MAY	15	07	32	22.7	19.38 N.	155.10 W.	8	...	...	3.2H	...	H	MAY	14	09	P.M.	HST
MAY	18	04	32	42.8	19.38 N.	155.10 W.	8	...	...	3.2H	III	H	MAY	17	06	P.M.	HST
MAY	18	20	46	43.1	19.51 N.	155.84 W.	10	...	...	3.3H	III	H	MAY	18	10	A.M.	HST
MAY	22	02	57	33.9	19.64 N.	155.96 W.	40	...	...	3.5H	...	H	MAY	21	04	P.M.	HST
MAY	23	20	29	28.6	19.28 N.	155.42 W.	35	...	...	3.1H	...	H	MAY	23	10	A.M.	HST
MAY	26	03	38	07.2	19.35 N.	155.11 W.	7	...	...	3.0H	...	H	MAY	25	05	P.M.	HST
MAY	28	00	18	22.5	19.30 N.	156.60 W.	40	...	...	3.2H	...	H	MAY	27	02	P.M.	HST
MAY	30	23	10	06.1	19.35 N.	155.11 W.	7	...	...	3.1H	II	H	MAY	30	01	P.M.	HST
JUNE	2	04	46	32.0	20.00 N.	156.00 W.	30	...	...	3.0H	...	H	JUNE	1	06	P.M.	HST
JUNE	4	11	42	52.6	19.42 N.	154.93 W.	8	...	...	3.1H	III	H	JUNE	4	01	A.M.	HST
JUNE	6	09	42	18.7	19.37 N.	155.08 W.	8	4.8	...	4.8H	V	H	JUNE	5	11	P.M.	HST		
JUNE	6	20	58	37.7	19.33 N.	155.19 W.	10	...	...	3.4H	III	H	JUNE	6	10	A.M.	HST
JUNE	7	07	14	18.9	19.52 N.	155.94 W.	10	...	...	3.0H	III	H	JUNE	6	09	P.M.	HST
JUNE	8	23	26	01.8	19.82 N.	156.02 W.	5	...	...	3.2H	...	H	JUNE	8	01	P.M.	HST
JUNE	15	01	22	00.8	19.33 N.	155.18 W.	10	...	...	3.1H	III	H	JUNE	14	03	P.M.	HST
JUNE	16	00	04	16.7	19.36 N.	155.13 W.	7	...	...	3.1H	...	H	JUNE	15	02	P.M.	HST
JUNE	17	14	56	51.1	19.36 N.	155.12 W.	8	...	...	3.0H	...	H	JUNE	17	04	A.M.	HST
JUNE	17	16	05	37.1	18.90 N.	155.50 W.	37	...	...	3.5H	...	H	JUNE	17	06	A.M.	HST
JUNE	22	13	45	21.8	19.34 N.	155.11 W.	9	...	...	3.7H	IV	H	JUNE	22	03	A.M.	HST
JUNE	23	10	36	27.6	19.80 N.	156.10 W.	3	...	...	3.5H	...	H	JUNE	23	00	A.M.	HST
JUNE	25	15	55	27.4	19.80 N.	156.10 W.	2	...	...	3.1H	...	H	JUNE	25	05	A.M.	HST
JUNE	29	11	24	36.1	19.36 N.	155.25 W.	10	...	...	3.7H	IV	H	JUNE	29	01	A.M.	HST
IDAHO																			
MAY	16	06	34	54.6	44.42 N.	114.42 W.	5	...	...	3.1A	...	G	MAY	15	11	P.M.	MST
MAY	16	16	58	49.8	42.60 N.	111.41 W.	5	...	...	2.9A	...	G	MAY	16	09	A.M.	MST
MAY	27	10	52	31.8	44.48 N.	111.11 W.	5	...	...	3.0A	...	G	MAY	27	03	A.M.	MST
MAY	28	13	36	35.6	44.42 N.	111.43 W.	5	...	...	3.2A	IV	G	MAY	28	06	A.M.	MST
JUNE	30	05	28	37.8	43.07 N.	111.48 W.	7	...	...	3.0A	...	G	JUNE	29	10	P.M.	MST
NEVADA																			
APR.	5	15	00	00.2	37.12 N.	116.06 W.	0	5.6	5.3	5.5B	...	A	APR.	5	07	A.M.	PST		
APR.	5	16	57	06.3	37.12 N.	116.06 W.	0	4.6	...	4.4B	...	G	APR.	5	08	A.M.	PST		
APR.	27	15	00	00.1	37.09 N.	116.03 W.	0	5.4	4.2	5.1B	...	A	APR.	27	07	A.M.	PST		
MAY	25	17	00	00.1	37.09 N.	116.05 W.	0	5.3	...	5.2B	...	A	MAY	25	09	A.M.	PST		
MAY	30	09	25	36.4	41.50 N.	115.47 W.	5	4.2	...	3.9B	...	G	MAY	30	01	A.M.	PST		
JUNE	5	14	08	32.0	36.54 N.	116.23 W.	6	...	...	3.7B	...	G	JUNE	5	06	A.M.	PST
JUNE	9	04	59	55.4	40.13 N.	115.26 W.	2	...	...	3.0G	...	G	JUNE	8	08	P.M.	PST
OHIO																			
JUNE	17	15	39	47.3	40.71 N.	84.58 W.	5	...	...	3.2K	VI	G	JUNE	17	10	A.M.	EST

Table 1.—Summary of U.S. earthquakes for April–June 1977—Continued

Date (1977)	Origin time (UTC)				Lat	Long	Depth (km)	Magnitude			Maximum intensity	Hypocenter source	Local time					
				mb				MS	ML or mbLg				Date	Hour				
	hr	min	s															
OREGON—OFF THE COAST																		
APR.	9	13	36	56.7	44.23 N.	128.93 W.	15	4.3	...	...	...	G	APR.	9	05	A.M.	PST
APR.	11	03	14	37.9	42.53 N.	126.22 W.	15	4.7	...	...	...	G	APR.	10	07	P.M.	PST
APR.	22	06	22	31.5	44.23 N.	129.38 W.	15	5.0	4.7	...	...	G	APR.	21	10	P.M.	PST
APR.	22	08	16	04.5	44.25 N.	129.27 W.	15	5.2	4.7	...	...	G	APR.	22	00	A.M.	PST
APR.	22	08	25	52.9	44.22 N.	129.39 W.	15	4.7	...	...	...	G	APR.	22	00	A.M.	PST
APR.	22	08	32	56.5	44.25 N.	129.28 W.	15	4.5	...	...	...	G	APR.	22	00	A.M.	PST
APR.	23	17	54	43.4	42.00 N.	126.74 W.	15	4.8	...	...	...	G	APR.	23	09	A.M.	PST
JUNE	25	19	09	26.0	41.98 N.	126.67 W.	18	4.7	4.0	...	...	G	JUNE	25	11	A.M.	PST
SOUTH CAROLINA																		
MAY	31	23	50	13.2	32.95 N.	80.24 W.	8	...	...	2.3G	II	G	MAY	31	06	P.M.	EST
TEXAS																		
APR.	26	09	03	07.3	31.90 N.	103.08 W.	4	...	...	3.3G	V	G	APR.	26	03	A.M.	CST
JUNE	7	23	01	20.4	33.06 N.	100.75 W.	5	...	...	4.0G	...	G	JUNE	7	05	P.M.	CST
WASHINGTON																		
JUNE	17	06	16	01.8	47.74 N.	122.71 W.	25	...	...	3.3G	V	W	JUNE	16	10	P.M.	PST
WYOMING																		
APR.	2	23	03	52.2	44.75 N.	110.82 W.	5	...	...	3.9G	III	G	APR.	2	04	P.M.	MST
APR.	3	04	43	52.3	44.71 N.	110.88 W.	5	...	...	2.9A	...	G	APR.	2	09	P.M.	MST
JUNE	17	11	52		NEAR NORRIS		.	...	...	...	IV	.	JUNE	17	04	A.M.	MST

Table 2.—Summary of macroseismic data for U.S. earthquakes, April–June 1977

[Sources of the hypocenter and magnitudes: (A) U.S. Energy Research and Development Administration; (B) University of California, Berkeley; (D) University of Montana, Missoula; (G) U.S. Geological Survey, National Earthquake Information Service; (H) U.S. Geological Survey, Hawaiian Volcano Observatory; (K) University of Michigan, Ann Arbor; (M) NOAA, Alaska Tsunami Warning Center, Palmer; (P) California Institute of Technology, Pasadena; (S) St. Louis University, St. Louis, Missouri; (W) University of Washington, Seattle. Dates and origin times are listed in Universal Coordinated Time (UTC) giving the hour, minute, and second. Epicenters are shown in decimal degrees. Only earthquakes with intensity data and explosions are listed]

Alabama	Alaska
<p>4 May (G) Southwestern Alabama</p> <p>Origin time: 02 00 22.9</p> <p>Epicenter: 31.98 N., 88.42 W.</p> <p>Depth: 5 km</p> <p>Magnitude: 3.6 mblg(S)</p> <p>The last earthquake located in this area occurred on October 23, 1976 in southeastern Mississippi (See Minsch and others, 1978).</p> <p><u>Intensity V:</u> Melbin.</p> <p><u>Intensity IV:</u> Yantley.</p>	<p>12 April (G) Kenai Peninsula, Alaska</p> <p>Origin time: 13 06 00.3</p> <p>Epicenter: 60.80 N., 149.22 W.</p> <p>Depth: 39 km</p> <p>Magnitude: 4.4 mb, 5.1 ML(M)</p> <p><u>Intensity III:</u> Anchorage, Indian House.</p> <p>18 April Central Alaska</p> <p>Origin time: 23 44</p> <p>Epicenter: Not located.</p> <p>Depth: None computed.</p> <p>Magnitude: 4.1 ML(M)</p> <p><u>Intensity III:</u> McGrath (M), Tatalina (M).</p>

Table 2.—Summary of macroseismic data for U.S. earthquakes,
April–June 1977—Continued

Alaska—Continued	
20 April (G) Kenai Peninsula, Alaska	
Origin time:	12 11 49.1
Epicenter:	59.45 N., 150.61 W.
Depth:	Normal.
Magnitude:	4.8 mb, 4.1 ML(M)
<u>Intensity IV:</u>	Homer (M).
23 April Central Alaska	
Origin time:	17 59
Epicenter:	Not located.
Depth:	None computed.
Magnitude:	None computed.
<u>Intensity II:</u>	Fairbanks (M).
23 April (G) Kenai Peninsula, Alaska	
Origin time:	21 57 20.6
Epicenter:	60.27 N., 151.14 W.
Depth:	80 km
Magnitude:	None computed.
<u>Intensity II:</u>	Fairbanks.
27 April (G) Central Alaska	
Origin time:	13 29 08.4
Epicenter:	62.29 N., 150.97 W.
Depth:	38 km
Magnitude:	3.1 ML(M)
<u>Intensity II:</u>	Gold Creek.
5 May (G) Central Alaska	
Origin time:	00 22 38.3
Epicenter:	64.84 N., 148.36 W.
Depth:	9 km
Magnitude:	3.7 ML(M)
<u>Intensity III:</u>	College, Fairbanks.
11 May (G) Central Alaska	
Origin time:	17 33 30.7
Epicenter:	61.70 N., 150.47 W.
Depth:	76 km
Magnitude:	3.9 mb
<u>Intensity IV:</u>	Willow.
<u>Intensity III:</u>	Kashwitna.
<u>Intensity II:</u>	Anchorage, Wasilla.
12 May Northern Alaska	
Origin time:	15 08
Epicenter:	Not located.
Depth:	None computed.
Magnitude:	None computed.
<u>Intensity III:</u>	Wiseman (loud roaring sound heard from a northerly direction).
25 May (G) Northern Alaska	
Origin time:	18 06 34.1
Epicenter:	67.38 N., 150.30 W.
Depth:	126 km
Magnitude:	None computed.
<u>Intensity III:</u>	Wiseman (roaring sound heard coming from the north, lasted about 6 seconds).

Table 2.—Summary of macroseismic data for U.S. earthquakes,
April–June 1977—Continued

Alaska—Continued	
30 May (G) Aleutian Islands, Alaska	
Origin time:	15 16 01.6
Epicenter:	52.43 N., 169.71 W.
Depth:	Normal
Magnitude:	5.6 mb, 6.0 MS, 6.0 MS(B), 6.0 MS(P)
<u>Intensity IV:</u>	Nikolski.
30 May (G) Kenai Peninsula, Alaska	
Origin time:	18 40 26.6
Epicenter:	60.89 N., 149.69 W.
Depth:	42 km
Magnitude:	None computed.
<u>Intensity II:</u>	Anchorage, Palmer, Potter.
2 June (G) Southern Alaska	
Origin time:	16 29 46.3
Epicenter:	61.31 N., 150.33 W.
Depth:	67 km
Magnitude:	3.6 mb
<u>Intensity V:</u>	Eagle River (felt by many people; several people awakened and frightened; small objects shifted and broken; hanging pictures fell; buildings creaked; dishes, doors, and windows rattled).
<u>Intensity IV:</u>	Anchorage (M), Palmer (M).
6 June (G) Southern Alaska	
Origin time:	10 08 11.5
Epicenter:	62.16 N., 149.55 W.
Depth:	60 km
Magnitude:	4.1 mb
<u>Intensity III:</u>	Palmer.
12 June (G) Southern Alaska	
Origin time:	21 09 14.4
Epicenter:	61.63 N., 146.15 W.
Depth:	35 km
Magnitude:	4.2 mb, 4.2 ML(M)
<u>Intensity III:</u>	Glenallen, Taps Sheep Camp, Valdez.
17 June (G) Southern Alaska	
Origin time:	05 32 12.0
Epicenter:	58.27 N., 151.82 W.
Depth:	36 km
Magnitude:	4.0 ML(M)
<u>Intensity III:</u>	Kodiak (M).
17 June (G) Southern Alaska	
Origin time:	08 26 28.9
Epicenter:	61.49 N., 150.32 W.
Depth:	74 km
Magnitude:	4.3 mb
<u>Intensity V:</u>	Many were awakened and frightened by the earthquake; buildings trembled; windows, doors, and dishes rattled; small objects shifted at the following locations: Anchorage, Chugiak,

Table 2.—Summary of macroseismic data for U.S. earthquakes,
April-June 1977—Continued

Alaska—Continued	
Fort Richardson, Girdwood, Palmer, Skwentna, Sterling, Talkeetna, Wasilla, Willow. <u>Intensity III</u> : Moose Pass.	
29 June (G) Andreanof Islands, Aleutian Islands	
Origin time: 08 47 15.6	
Epicenter: 51.77 N., 176.22 W.	
Depth: 60 km	
Magnitude: 5.0 mb	
<u>Intensity IV</u> : Adak.	
Arkansas	
2 June (S) Southwestern Arkansas	
Origin time: 23 29 10.4	
Epicenter: 34.61 N., 94.19 W.	
Depth: 10 km	
Magnitude: 4.3 mb(G), 4.0 mbLg	
<u>Intensity VI</u> : Board Camp (hairline cracks in exterior walls, cracked chimneys, small objects and light furniture shifted, felt by many), Hatfield (sidewalks slightly cracked, foundations cracked, buildings trembled, felt by many).	
<u>Intensity V</u> : Black Springs, De Queen, Gillham, Mena, Saratoga, Umpire.	
<u>Intensity IV</u> : Grannis, Wickes.	
<u>Intensity III</u> : Langley.	
California	
2 April (B) Northern California	
Origin time: 06 09 11.9	
Epicenter: 40.57 N., 123.90 W.	
Depth: 14 km	
Magnitude: 4.4 mb(G), 3.6 ML	
<u>Intensity IV</u> : Ferndale, Miranda.	
6 April (P) Southern California	
Origin time: 06 01 02.2	
Epicenter: 33.47 N., 116.47 W.	
Depth: 16 km	
Magnitude: 3.5 ML	
<u>Intensity III</u> : Coachella Valley area.	
4 May (B) Northern California	
Origin time: 06 59 10.5	
Epicenter: 39.41 N., 121.49 W.	
Depth: 7 km	
Magnitude: 3.5 ML	
<u>Intensity V</u> : Marysville (awakened and frightened a few, buildings trembled, water in small containers disturbed).	
<u>Intensity IV</u> : Oroville (felt by many, awakened a few, windows and dishes rattled).	

Table 2.—Summary of macroseismic data for U.S. earthquakes,
April-June 1977—Continued

California—Continued	
4 May (B) Northern California	
Origin time: 19 43 33.8	
Epicenter: 38.17 N., 121.94 W.	
Depth: 26 km	
Magnitude: 3.2 ML	
<u>Intensity III</u> : Fairfield (B), Pittsburg (B), Travis Air Force Base (B), Vacaville (B).	
5 May (B) Northern California	
Origin time: 22 40 31.7	
Epicenter: 38.17 N., 121.94 W.	
Depth: 26 km	
Magnitude: 3.3 ML	
<u>Intensity III</u> : Antioch (B), Fairfield (B), Pittsburg (B), Travis Air Force Base (B).	
<u>Intensity II</u> : Crockett.	
21 May (B) California-Nevada border region	
Origin time: 00 28 19.7	
Epicenter: 37.65 N., 118.75 W.	
Depth: 12 km	
Magnitude: 3.4 ML(B)	
<u>Intensity IV</u> : Bishop (felt by all at the South Landing of Crowley Lake; buildings creaked; windows, doors, and dishes rattled).	
25 May (P) Southern California	
Origin time: 08 22 00.9	
Epicenter: 34.15 N., 119.15 W.	
Depth: 4 km	
Magnitude: 2.5 ML	
<u>Intensity II</u> : Oxnard.	
30 May (P) Southern California	
Origin time: 16 16 37.9	
Epicenter: 33.90 N., 117.88 W.	
Depth: 5 km	
Magnitude: 2.6 ML	
<u>Intensity V</u> : Brea-Yorba Linda area (police received 50 calls, including a report of dishes broken when shaken from a cabinet--press report), La Habra (many frightened, some awakened).	
<u>Intensity IV</u> : Fullerton.	
30 May (P) Southern California	
Origin time: 21 17 02.9	
Epicenter: 33.90 N., 117.88 W.	
Depth: 5 km	
Magnitude: 2.4 ML	
<u>Intensity II</u> : Orange County (P).	
31 May (B) Northern California	
Origin time: 16 40 24.2	
Epicenter: 40.88 N., 122.33 W.	
Depth: 15 km	
Magnitude: 3.7 ML	
<u>Intensity IV</u> : Project City, Shasta County (buildings shook, shock felt by a few people), Mount Shasta area, Whiskeytown Lake Visitor's Center (press report).	

Table 2.—Summary of macroseismic data for U.S. earthquakes,
April-June 1977—Continued

California--Continued

- 4 June (B) Northern California
Origin time: 20 57 07.5
Epicenter: 38.20 N., 121.97 W.
Depth: 26 km
Magnitude: 3.8 ML
Intensity V: Fairfield, Martinez, Solano, Suisun, Travis Air Force Base, Vacaville, Yountville.
Intensity IV: Clayton, Crockett, Rio Nido, San Carlos.
Intensity III: Birds Landing, Pinole, Stockton.
Intensity II: Pleasant Hill, Port Costa, St. Helena, Vallejo.
- 7 June (B) Northern California
Origin time: 01 14 22.0
Epicenter: 41.00 N., 123.87 W.
Depth: 28 km
Magnitude: 4.6 mb(G), 3.9 ML
Intensity V: Eureka, Fortuna, McKinleyville, Rio Dell, Trinidad.
Intensity IV: Bayside, Blue Lake, Hoopa, Korb, Lakehead.
Intensity III: Ferndale, Loleta.
Intensity II: Dunsmuir, Round Mountain, Willow Creek.
- 11 June (P) Southern California
Origin time: 14 18 20.5
Epicenter: 34.38 N., 118.62 W.
Depth: 5 km
Magnitude: 3.1 ML
Intensity III: Newhall.
- 13 June (P) Southern California
Origin time: 03 19 36.9
Epicenter: 33.87 N., 118.63 W.
Depth: 5 km
Magnitude: 2.8 ML
Intensity II: Santa Monica.
- 14 June (P) Southern California
Origin time: 01 56 33.6
Epicenter: 34.02 N., 118.32 W.
Depth: 5 km
Magnitude: 2.7 ML
Intensity II: Culver City, Glendale, downtown Los Angeles.
- 17 June (P) Baja California, Mexico
Origin time: 18 42 47.6
Epicenter: 32.05 N., 117.33 W.
Depth: 6 km
Magnitude: 3.3 ML
Intensity III: San Diego.
- 17 June (B) Northern California
Origin time: 19 38 48.4
Epicenter: 38.18 N., 121.93 W.
Depth: 22 km
Magnitude: 3.5 ML

Table 2.—Summary of macroseismic data for U.S. earthquakes,
April-June 1977—Continued

California--Continued

The following intensity information is based on a telephone report from the University of California, Berkeley.

Intensity IV: Travis Air Force Base.

Intensity III: Albany, Fairfield, Fairmont, Pacifica.

- 20 June (P) Southern California
Origin time: 18 33 00.1
Epicenter: 34.02 N., 118.32 W.
Depth: 10 km
Magnitude: 2.5 ML
Intensity II: Inglewood.

- 21 June (B) Central California
Origin time: 02 43 06.9
Epicenter: 37.65 N., 121.64 W.
Depth: 10 km
Magnitude: 4.7 mb(G), 3.5 MS(G), 4.6 ML

This earthquake was felt over an area of approximately 15,700 sq km (fig. 7).

Intensity VI: El Granada (plaster and dry wall cracked), French Camp (sidewalks cracked slightly).

Intensity V: Houses trembled, people were frightened, and small objects moved at most of the places listed below: Alameda, Alamo, Arnold, Big Oak Flat, Banta, Belmont, Ben Lomond, Berkeley, Bethel Island, Birds Landing, Boulder Creek, Burlingame, Castro Valley, Colma, Concord, Crockett, Daly City, Danville, Davenport, Diablo, East Stockton, El Cerrito, El Sobrante, Farmington, Felton, Foster City, Fremont, Half Moon Bay, Hathaway Pines, Hayward, Hercules (a few windows cracked), Lafayette, Larkspur, Livermore, Los Gatos, Manteca, Martinez, Millbrae, Mill Valley, Modesto, Moraga, Moss Beach, Mountain Ranch, Mountain View, Mount Eden, Newark, Novato, Oakland, Olema, Pacifica, Palo Alto, Pinole, Pioneer, Pleasanton, Port Costa, Redwood City, Ross, Saint Helena, San Bruno, San Carlos, San Francisco, San Jose, San Leandro, San Lorenzo, Santa Clara, Sonoma, South San Francisco, Stinson Beach, Stockton, Sunol, Sunset, Tiburon, Tracy, Union City, Vallejo, Valley Springs, Vernalis, Vineburg, Walnut Creek, Walnut Grove, West Menlo Park, Wilseyville.

Intensity IV: Bolinas, Byron, Forest Knolls, Glencoe, Greenbrae, La Honda, Loma Mar, Milpitas, Orinda, Railroad Flat, San Gregorio, Vallecito, Woodacre.

Intensity III: Clayton, Courtland, Elk Grove, Elmira, Holt, Point Reyes Station, Rodeo.

Intensity II: Angels Camp, Antioch, Patterson, Portola Valley, Ryde, Salida, Santa Cruz.

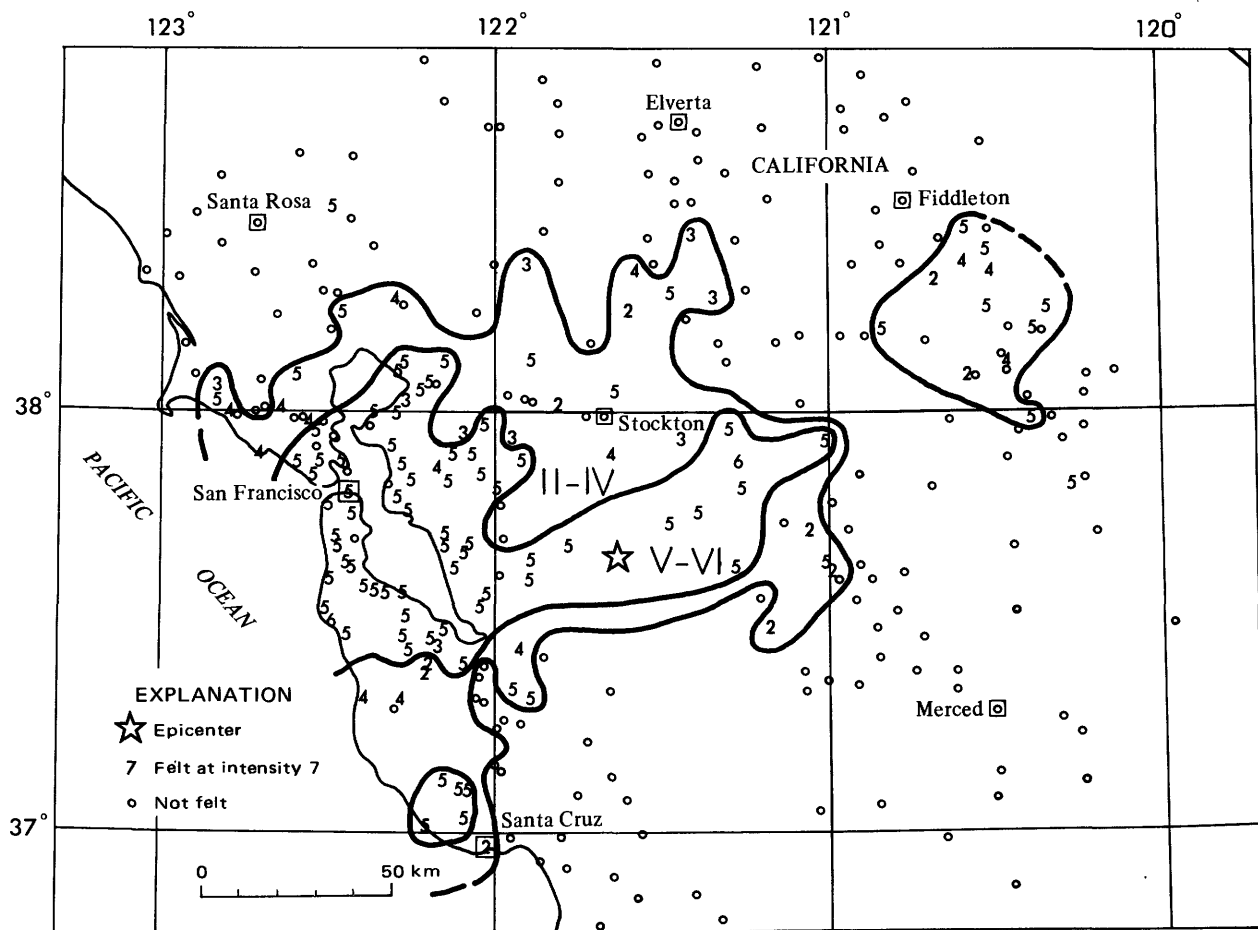


FIGURE 7.--Isoseismal map for the central California earthquake of 21 June 1977, 02 43 06.9 UTC. Roman numerals represent Modified Mercalli intensities between isoseismals; Arabic numerals are used to represent these intensities at specific sites.

Table 2.--Summary of macroseismic data for U.S. earthquakes, April-June 1977--Continued

Hawaii	
The locations shown below followed by (H) designate intensity values assigned by the Hawaiian Volcano Observatory.	
6 April (H) Island of Hawaii	
Origin time:	21 00 25.2
Epicenter:	19.36 N., 155.09 W.
Depth:	9 km
Magnitude:	3.6 ML
<u>Intensity IV:</u>	Hilo (H).
<u>Intensity III:</u>	Papaikou (H).
11 April (H) Island of Hawaii	
Origin time:	06 31 16.2
Epicenter:	19.32 N., 155.27 W.
Depth:	9 km
Magnitude:	3.0 ML
<u>Intensity III:</u>	Mountain View (H).

Table 2.--Summary of macroseismic data for U.S. earthquakes, April-June 1977--Continued

Hawaii--Continued	
21 April (H) Island of Hawaii	
Origin time:	04 49 21.9
Epicenter:	20.02 N., 155.31 W.
Depth:	10 km
Magnitude:	5.1 ML
<u>Intensity V:</u>	Hilo (H), Honokaa (H), Waimea (H).
<u>Intensity IV:</u>	Islandwide (press report), Pohakuloa (press report), Puna District (H).
21 April (H) Island of Hawaii	
Origin time:	11 51 31.9
Epicenter:	19.32 N., 155.27 W.
Depth:	9 km
Magnitude:	3.6 ML
<u>Intensity III:</u>	Mountain View (H), Volcano (H).

Table 2.—Summary of macroseismic data for U.S. earthquakes,
April-June 1977—Continued

Hawaii—Continued	
22 April (H) Island of Hawaii	
Origin time:	19 44 00.0
Epicenter:	19.32 N., 155.26 W.
Depth:	9 km
Magnitude:	4.0 ML
<u>Intensity IV:</u>	Hawaiian Volcano Observatory (H), Hilo (H), Volcano.
<u>Intensity III:</u>	Kamuela (H), Kona (H), Waimea (press report).
26 April (H) Island of Hawaii	
Origin time:	04 20 53.0
Epicenter:	19.34 N., 155.23 W.
Depth:	9 km
Magnitude:	3.5 ML
<u>Intensity III:</u>	Hawaii Volcanoes National Park (H), Kurtistown (H), Mountain View (H).
2 May (H) Island of Hawaii	
Origin time:	18 54 05.4
Epicenter:	20.08 N., 155.36 W.
Depth:	8 km
Magnitude:	3.7 ML
<u>Intensity IV:</u>	Ahualoa (H), Honokaa (H), Kamuela (H).
<u>Intensity III:</u>	Hilo (H), Papaikou (H), Pepeekeo (H).
4 May (H) Island of Hawaii	
Origin time:	14 22 58.1
Epicenter:	20.24 N., 155.76 W.
Depth:	34 km
Magnitude:	3.1 ML
<u>Intensity III:</u>	Ahualoa (H), Waimea (H).
12 May (H) Island of Hawaii	
Origin time:	09 11 06.3
Epicenter:	19.31 N., 155.22 W.
Depth:	10 km
Magnitude:	3.1 ML
<u>Intensity III:</u>	Papaikou (H).
14 May (H) Island of Hawaii	
Origin time:	15 35 10.8
Epicenter:	19.34 N., 155.23 W.
Depth:	9 km
Magnitude:	3.0 ML
<u>Intensity II:</u>	Volcano (H).
15 May (H) Island of Hawaii	
Origin time:	07 27 13.1
Epicenter:	19.37 N., 155.10 W.
Depth:	8 km
Magnitude:	3.6 ML
<u>Intensity III:</u>	Hilo (H), Volcano (H).
<u>Intensity II:</u>	Glenwood (H), Kurtistown (H), Mountain View (H).
18 May (H) Island of Hawaii	
Origin time:	04 32 42.8

Table 2.—Summary of macroseismic data for U.S. earthquakes,
April-June 1977—Continued

Hawaii—Continued	
Epicenter:	19.38 N., 155.10 W.
Depth:	8 km
Magnitude:	3.2 ML
<u>Intensity III:</u>	Hilo (H).
<u>Intensity II:</u>	Pepeekeo (H).
18 May (H) Island of Hawaii	
Origin time:	20 46 43.1
Epicenter:	19.51 N., 155.84 W.
Depth:	10 km
Magnitude:	3.3 ML
<u>Intensity III:</u>	Captain Cook (H).
30 May (H) Island of Hawaii	
Origin time:	23 10 06.1
Epicenter:	19.35 N., 155.11 W.
Depth:	7 km
Magnitude:	3.1 ML
<u>Intensity II:</u>	Pepeekeo (H).
4 June (H) Island of Hawaii	
Origin time:	11 42 52.6
Epicenter:	19.42 N., 154.93 W.
Depth:	8 km
Magnitude:	3.1 ML
<u>Intensity III:</u>	Pahoa (H).
6 June (H) Island of Hawaii	
Origin time:	09 42 18.7
Epicenter:	19.37 N., 155.08 W.
Depth:	8 km
Magnitude:	4.8 mb, 4.8 ML(H)
<u>Intensity V:</u>	Captain Cook, Hilo, Honokaa, Honolulu, Kaaau, Kurtistown, Mountain View, Pahala, Pahoa, Papaaloa, Pepeekeo.
<u>Intensity IV:</u>	Ookala.
6 June (H) Island of Hawaii	
Origin time:	20 58 37.7
Epicenter:	19.33 N., 155.19 W.
Depth:	10 km
Magnitude:	3.4 ML
<u>Intensity III:</u>	Pepeekeo (H), Volcano (H).
7 June (H) Island of Hawaii	
Origin time:	07 14 18.9
Epicenter:	19.52 N., 155.94 W.
Depth:	10 km
Magnitude:	3.0 ML
<u>Intensity III:</u>	Kona (H).
<u>Intensity II:</u>	Keokea (H).
15 June (H) Island of Hawaii	
Origin time:	01 22 00.8
Epicenter:	19.33 N., 155.18 W.
Depth:	10 km
Magnitude:	3.1 ML
<u>Intensity III:</u>	Hilo (H).
<u>Intensity II:</u>	Papaikou (H), Pepeekeo (H), Volcano (H).

Table 2.—Summary of macroseismic data for U.S. earthquakes,
April-June 1977—Continued

Hawaii--Continued	
22 June (H) Island of Hawaii	
Origin time:	13 45 21.8
Epicenter:	19.34 N., 155.11 W.
Depth:	9 km
Magnitude:	3.7 ML
<u>Intensity IV:</u>	Hilo (H), Papaikou (H).
<u>Intensity III:</u>	Mountain View (H).
<u>Intensity II:</u>	Kau (H).
29 June (H) Island of Hawaii	
Origin time:	11 24 36.1
Epicenter:	19.36 N., 155.25 W.
Depth:	10 km
Magnitude:	3.7 ML
<u>Intensity IV:</u>	Hilo (H).
<u>Intensity III:</u>	Hawaii Volcanoes National Park (H), Mountain View (H).
Idaho	
28 May (G) Eastern Idaho	
Origin time:	13 36 35.6
Epicenter:	44.42 N., 111.43 W.
Depth:	5 km
Magnitude:	3.2 ML(A), 4.0 ML(D)
<u>Intensity IV:</u>	Wyoming--Madison Junction (one person awakened), Old Faithful Visitor's Center (buildings creaked, windows rattled loudly).
Nevada	
5 April (A) Southern Nevada	
Origin time:	15 00 00.167
Epicenter:	37.12 N., 116.06 W.
Depth:	0 km
Magnitude:	5.6 mb(G), 5.3 MS(G), 5.5 ML(B)
Nevada Test Site explosion "MARSILLY" at 37° 07'12.84" N., 116°03'44.21" W., surface elevation 1286 m, depth of burial 690 m.	
5 April (G) Southern Nevada	
Origin time:	16 57 06.3
Epicenter:	37.12 N., 116.06 W.
Depth:	0 km
Magnitude:	4.6 mb, 4.4 ML(B)
Collapse from the Nevada Test Site explosion on 5 April, 15 00 00.2 UTC.	
27 April (A) Southern Nevada	
Origin time:	15 00 00.084
Epicenter:	37.09 N., 116.03 W.

Table 2.—Summary of macroseismic data for U.S. earthquakes,
April-June 1977—Continued

Nevada--Continued	
Depth:	0 km
Magnitude:	5.4 mb(G), 4.2 MS(G), 5.1 ML(B)
Nevada Test Site explosion "BULKHEAD" at 37° 05'41.23" N., 116°01'40.37" W., surface elevation 1286 m, depth of burial 594 m.	
25 May (A) Southern Nevada	
Origin time:	17 00 00.076
Epicenter:	37.09 N., 116.05 W.
Depth:	0 km
Magnitude:	5.3 mb(G), 5.2 ML(B)
Nevada Test Site explosion "CREWLINE" at 37° 05'39.58" N., 116°02'41.50" W., surface elevation 1264 m, depth of burial 564 m.	
Ohio	
17 June (K) Northwestern Ohio	
Origin time:	15 39 47.3
Epicenter:	40.71 N., 84.58 W.
Depth:	5 km
Magnitude:	3.2 mbLg
F. J. Mauk, Seismological Observatory, University of Michigan, Ann Arbor, provided questionnaires; they were published in the Celina Daily Standard and were then evaluated by the U.S. Geological Survey. The damage reports were not confirmed. There were no felt reports from the U.S. Geological Survey cavass of more distant locations.	
<u>Intensity VI:</u>	Slight damage at the following locations: Celina--7708 Weitz Rd. (foundation cracked, sidewalk cracked). Coldwater--3262 State Rd. (cracked sidewalk, cracked plaster, water changes), 406 E. South (fallen plaster), 316 E. North (foundations cracked, house moved slightly on foundation--mobile home). Fort Recovery--941 Siegrist-Jutte Rd. (water tank cracked, stone fences cracked). Rockford--412 S. Main St. (hairline cracks in exterior walls, sidewalks cracked, ceiling light fixture loosened).
<u>Intensity V:</u>	Many residents frightened, buildings trembled, heavy furniture shifted, and some pictures knocked from walls at the following locations: Celina--2302 Ash Harbor Pt., 6173

Table 2.—Summary of macroseismic data for U.S. earthquakes,
April–June 1977—Continued

Ohio—Continued	
Burkettsville, 110 N. Cherry, 431 W. Fayette, 225 and 226 E. Forest, 6797 Janet Ave., 220 Jill Ave., 426 Magnolia St., 311 S. Main, 430 S. Main, 608 N. Main, 1305 Michael Ave., 430 S. Mill, 221 N. Mill, 4300 Moore Rd., 2520 St. Anthony Rd., 4630 Tama Rd., 440 W. Touville, 6432 Wabash Rd., 6654 Wabash Rd., 415 E. Wayne St., 618 Willow St., 7619 U.S. Rt. 127, R.R. 4, 6070 Rt. 219.	
Coldwater—350 E. Elizabeth St., 4769 Gause Rd., 2916 Hillcrest Dr., 109 Mazian Dr., 3275 Menckhofer Rd., 601 W. Main St., 307 N. Mill St., 500 E. Walnut St.	
Montezuma—4.8 km south of Celina.	
Rockford—Rt. 3, Box 179 (6.4 km south of Rockford), 1327 Tama Road.	
St. Henry—242 N. Sycamore.	
<u>Intensity IV:</u> Chickasaw (buildings shaken—press report).	

South Carolina	
31 May (G) Southeastern South Carolina	
Origin time: 23 50 13.2	
Epicenter: 32.95 N., 80.24 W.	
Depth: 8 km	
Magnitude: 2.3 mbLg	
<u>Intensity II:</u> Summerville.	

Texas	
26 April (G) Southwestern Texas	
Origin time: 09 03 07.3	
Epicenter: 31.90 N., 103.08 W.	
Depth: 4 km	
Magnitude: 3.3 ML	
<u>Intensity V:</u> Kermit (awakened and frightened a few).	

Washington	
17 June (W) Puget Sound, Washington	
Origin time: 06 16 01.8	
Epicenter: 47.74 N., 122.71 W.	
Depth: 25 km	
Magnitude: 3.3 ML(G)	
<u>Intensity V:</u> Bainbridge Island, Bothell, Bremerton, Brinnon, Chimacum, Everett, Hadlock, Hansville, Indianola, Kirkland, Lilliwaup, Marysville, McCleary, Mukilteo, Nordland, Olympia, Port	

Table 2.—Summary of macroseismic data for U.S. earthquakes,
April–June 1977—Continued

Washington—Continued	
Orchard, Quilcene, Seattle, Snoqualmie.	
<u>Intensity IV:</u> Clinton, Langley, Magnolia, Seabeck, Tracyton.	
<u>Intensity III:</u> Kingston.	
<u>Intensity II:</u> Arlington, Hoodsport, Oak Harbor.	
Wyoming	
2 April (G) Yellowstone National Park	
Origin time: 23 03 52.2	
Epicenter: 44.75 N., 110.82 W.	
Depth: 5 km	
Magnitude: 3.9 ML, 3.5 ML(A)	
<u>Intensity III:</u> Yellowstone National Park.	
28 May (G) Eastern Idaho	
Origin time: 13 36 35.6	
See Idaho listing.	
17 June Yellowstone National Park	
Origin time: 11 52	
Epicenter: Not located.	
Depth: None computed.	
Magnitude: None computed.	
<u>Intensity IV:</u> Norris Geyser Basin Museum Apartment (a few awakened by shock).	

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